AMERICAN SOCIETY FOR TESTING MATERIALS
BULLETIN

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"Promotion of Knowledge of Materials of Engineering and Standardization of Specifications and Methods of Testing"

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Symposium on High-Strength Constructional Metals at 1936 Regional Meeting

Regional Meeting and Spring Group Meetings of Committees to be Held in Pittsburgh During Week of March 2

THE 1936 A.S.T.M. Regional Meeting which is to be held at the Hotel William Penn in Pittsburgh on March 4 will be featured by a Symposium on High-Strength Constructional Metals. The symposium will comprise papers by outstanding technologists in the metallurgical fields. During the week of March 2–6, the 1936 Spring Group Meetings of A.S.T.M. Committees will be in progress. In returning to Pittsburgh for this series of meetings, the Executive Committee has chosen a city where one of the Society's most successful regional meetings was held, namely, that in 1931, which was featured by a Symposium on Welding.

General arrangements for the 1936 meetings will be in the charge of the Pittsburgh District Committee, the reorganization of which was announced in a previous BULLETIN. This committee is headed by Dean Harvey, Materials Engineer, Materials and Process Engineering Dept., Westinghouse Electric and Mfg. Co., with F. M. Howell, Secretary, Engineer of Tests, Aluminum Research Laboratories, Aluminum Company of America.

The A.S.T.M. regional meetings have as their chief purposes the stimulating of interest in the Society's program of standardization and research work, with a resulting fuller realization of its value and importance, and they also present an opportunity to hold technical sessions at which up-to-date data and information of a practical nature may be presented on subjects akin to the Society's work. As a rule the subjects selected for the technical sessions are of particular interest to the regions where meetings are scheduled. The subject for the 1936 Regional Meeting Symposium should be pertinent in view of Pittsburgh's status as a leading metallurgical center.

Interesting Symposium Planned

Since the subject "High-Strength Constructional Metals" is of much interest to various Society standing committees in the metals field, the program committee includes representatives of certain of these groups serving with members of the Pittsburgh District Committee. Mr. Jerome Strauss, recently advanced to Vice-President in Charge of Research and Development, Vanadium Corporation of America, is chairman of the committee, the personnel of which follows:

JEROME STRAUSS, *Chairman*
F. H. FRANKLAND, Technical Director, American Institute of Steel Construction
R. A. WILKINS, Vice-President, Revere Copper and Brass, Inc.
E. H. DIX, JR., Chief Metallurgist, Aluminum Research Laboratories, Aluminum Company of America
DEAN HARVEY, Materials Engineer, Materials and Process Engineering Dept., Westinghouse Electric and Mfg. Co.

The committee has had the cooperation of a number of other Society members interested in the subject.

While final details of the Regional Meeting program and the papers will be announced in the January BULLETIN, preliminary plans are well along and are outlined here for the information of Society members.

It is planned that the symposium will be held in two sessions, on the morning and afternoon of Wednesday, March 4. One of these sessions will be devoted to papers on nonferrous metals and the other on steels. In selecting papers and authors, the Program Committee has indicated its intention not to consider metals and alloys used in the construction of machinery, such as machine tools, airplane engines, automobile mechanisms, etc., but chiefly those employed for such constructional applications as buildings, bridges, ships, automobile and railway car bodies, airplane wings, tanks and the like. It is planned that the papers will deal with chemical and physical properties, as well as manufacturing and fabricating properties, such for example as hot and cold working, welding, etc. It is intended that the papers will consider very briefly and only where deemed essential, matters concerned with design stresses, construction economy and the like.

The authors of the papers will attempt to treat materials coming within the general classification of the main subject and include not only those which are already firmly established industrially, but others which are in the commercial stage of development, although perhaps not yet in widespread use. This latter object is of importance in outlining the trend of the immediate future. The preliminary program is as follows:

ALLOYS OF COPPER—H. A. Bedworth, Superintendent of Service Engineering, The American Brass Co.
ALUMINUM and MAGNESIUM ALLOYS—E. H. Dix, Jr., Chief Metallurgist, Aluminum Research Laboratories, Aluminum Company of America.
NICKEL and ITS ALLOYS—A. J. Wadhams, The International Nickel Co.
CARBON and LOW-ALLOY STEELS—E. F. Cone, Editor, *Metals & Alloys.*
CORROSION-RESISTING STEELS—E. E. Thum, Editor, *Metal Progress.*

All A.S.T.M. members, associates and others interested are cordially invited to attend the sessions in which the symposium will be held and also the dinner which is to follow the afternoon session.

Group Meetings of Committees

As stated above the 1936 Spring Group Meetings of A.S.T.M. Committees will be in progress from Monday, March 2, through Friday, March 6. It is expected a large number of the committees will participate in these meetings.

Arrangements are under way with the various railway passenger associations for the granting of the certificate plan of transportation, thus enabling members to save a considerable portion of their traveling expenses. Information on room reservations, announcements of committees which are participating in the series and other related information will be given in more detail in the January BULLETIN.

Work of Sectional Committee on Cast-Iron Pipe

The Sectional Committee on Specifications for Cast-Iron Pipe which is jointly sponsored by a number of societies, including A.S.T.M., under the procedure of the American Standards Association, has a number of important research projects under way. Six American universities are concerned with tests for the committee, the results to be issued eventually in six extensive bulletins.

The Sectional Committee has recently announced that Cornell University has published Cornell University Engineering Experiment Station Bulletin No. 20 on "Long *Versus* Short Body Fittings for Water Supply." Part I of this report covers a series of tests, made for the Sectional Committee, by E. W. Schoder and A. N. Vanderlip, on Friction Loss Through Cast-Iron Pipe Fittings, some of the fittings tested being the present AWWA standard and the others of proposed short body types.

Part II of this bulletin is entitled "Economic Comparison Considering Operating Cost, as Affected by Friction, and Installation Cost" by Messrs. A. T. Ricketts and T. H. Wiggin, the latter the chairman of the Sectional Committee. This is an application of the results of the Cornell tests to the hydraulics of a typical water distribution system, for both domestic and fire flows, and a similar application to pumping station headers.

This bulletin is the second in the series. The first was issued by Ohio State University Engineering Experiment Station entitled "Investigation of Bell and Spigot Joints in Cast-Iron Water Pipes" by Prof. J. C. Prior. This bulletin consists of three parts, respectively dealing with Pull-Out Strength of Bell and Spigot Joints with Special Reference to Bell Strength; and an Investigation of the Strength of a Harness for Retaining a 36-in. Bell and Spigot Joint in Cast-Iron Water Pipes. Two appendices give the proceedings of Subcommittee 1-B, of which Prof. J. C. Prior is chairman, pertaining to matters discussed in this bulletin, and harness designs by Messrs. T. H. Wiggin, W. R. Conard and J. W. Moore, respectively. This bulletin, No. 87, can be ordered from Ohio State University at 50 cents per copy.

The Cornell University bulletin, No. 20, comprises 102 pages, illustrated with tables and photographs. Copies can be obtained from the Director, Engineering Experiment Station, Cornell University, Ithaca, N. Y., at $1.25 per copy.

Robert W. Lesley

1853-1935

ROBERT W. LESLEY, one of the early pioneers in the organization of the Society, a member since 1898, an honorary member, and one of the five men whose signature appears on the Society charter, died at his home in Haverford on November 9 after a short illness. Mr. Lesley was a leader in the American cement industry and active in civic affairs. His age was 82.

ROBERT W. LESLEY

An outline of Mr. Lesley's outstanding activities appeared in the April BULLETIN, together with an interesting article which he had prepared giving some anecdotes of early Society years. After receiving his education in France and at the University of Pennsylvania, he entered the newspaper field. Following this he studied law and was admitted to the bar. In 1874 the firm of Lesley & Trinkle was organized to deal in cement and in 1882 under Mr. Lesley and a group of associates the present Giant Portland Cement Co. was founded.

In 1904, he founded the magazine *Cement Age*, serving as editor and publisher until 1912, when it was consolidated with *Concrete Engineering* and published thereafter under the present name *Concrete*. For many years he was consulting editor of the latter journal.

Mr. Lesley was a director of a number of industrial companies and a member of many scientific and technical societies. He was the first president of the Portland Cement Assn., and later an honorary member. He was also an honorary member of the American Concrete Institute.

In the Society Mr. Lesley served as Treasurer from 1900 to 1902 and as Vice-President from 1902 to 1912. He held membership on Committee C-1 on Cement since its organization in 1902 and he maintained regular attendance at the meetings of the Society and Committee C-1. He was active in the work of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete and during the war he was a member of the Concrete Ship Committee, and managed the Clarke Thomson Aviation Research which was later associated with the National Advisory Committee for Aeronautics.

He took a great interest in golf and for the past thirteen years was president of the Merion Cricket Club. He was director and past-president of the Philadelphia Golf Assn. and in 1924 was President of the U. S. Senior Golf Assn.

Mr. Lesley is survived by his widow, Mrs. Eulalia Wilcox Lesley and a daughter, Mrs. Richard Berridge.

In the death of Mr. Lesley, the Society loses one of its oldest members, one who performed yeoman service in organizing it and keeping it a forward moving organization during its formative years. He was the last surviving member of the seven men who applied for the Society charter. He was highly esteemed by those who knew him and his death will be a keen loss to his friends and associates.

Cleveland Meeting to Discuss Pearlitic Malleable Iron

Announcement was made in the October BULLETIN that the Cleveland District Committee was planning to sponsor a meeting in January, 1936, the principal feature to be a technical session devoted to discussion of pearlitic malleable iron. The meeting will be held on Monday evening, January 27, at the Cleveland Club, Carnegie and East 107th St., Cleveland. A dinner which will precede the technical session is scheduled to start at 6:30 p.m.

In selecting a topic for discussion at the meeting, the Cleveland District Committee was cognizant of the interest in pearlitic malleable iron and believes the program which is being developed will be of much interest, not only to members of the Society in the Cleveland area and to members of other societies who will be invited to participate in the meeting, but to many A.S.T.M. members not located in the Cleveland area.

Dr. H. A. Schwartz, chairman of the Cleveland District Committee, and Manager of Research, National Malleable and Steel Castings Co., appointed the program committee consisting of the following:

H. M. BOYLSTON, *Chairman*, Professor of Metallurgy, In Charge of Department of Metallurgical Engineering, Case School of Applied Science
D. M. AVEY, Editor, *The Foundry*
HENRY CHANDLER, Assistant to President, Vanadium Corporation of America
R. E. KENNEDY, Technical Secretary, American Foundrymen's Assn.
H. A. SCHWARTZ, *Ex-officio*
F. G. STEINEBACH, Managing Editor, *The Foundry*
F. L. WOLF, Technical Director, Ohio Brass Co.

Of this committee, Messrs. Boylston, Avey, Schwartz, and Wolf are representing the Cleveland District Committee; Mr. Kennedy is cooperating in the work on behalf of the American Foundrymen's Assn.; Mr. Chandler is representing Committee A-7 on Malleable Iron Castings and Mr. Steinebach is acting as the representative of the Northeastern Ohio Chapter of the A.F.A.

The committee has been at work for several weeks preparing the program. It will consist essentially of an extensive paper which is being prepared by the committee as a whole from material furnished from various sources interested in pearlitic malleable irons. The term, pearlitic malleable iron, has been suggested as the best compromise for designating materials cast as white cast iron and subsequently heat-treated so as to retain significant amounts of combined carbon.

Invitations are being extended to members of local sections of the American Foundrymen's Assn., American Society for Metals and to other groups who may be interested, including the Cleveland Engineering Society. The district committee especially wishes it to be known that out-of-town members of A.S.T.M. or of other engineering societies will be welcome.

The committee is planning the meeting so that there will be ample opportunity for discussion of the paper which is being prepared by the program committee, and it is tentatively planned that a limited number of copies will be distributed to technologists and companies interested in the product in order to stimulate constructive comment.

The Cleveland District Committee is planning to send notices and reservation cards to the A.S.T.M. members in its district and to members of the Cleveland chapters of the various other societies. It would be helpful to the committee if Society members who do not receive reservation cards, but who are planning to attend the dinner and meeting, would inform the secretary of the district committee, Mr. A. J. Tuscany, Consultant in Trade Association Organization and Management, 1213 W. Third St., Cleveland, or either of the two A.S.T.M. Cleveland members who are making arrangements for the dinner and place of meeting, namely, J. H. Herron, President, The James H. Herron Co., 1360 W. Third St., and C. B. Murray, President, Crowell & Murray, Inc., 806 Perry-Payne Building.

Industrial Fuels Subject of January Meeting in Philadelphia

The feature of the meeting in Philadelphia which is to be sponsored jointly by the A.S.T.M. Philadelphia District Committee and the Philadelphia Engineers' Club as announced in a previous BULLETIN, is to be a Symposium on Industrial Fuels. The symposium will be held in two sessions, on the afternoon and evening of Tuesday, January 21, at the Engineers' Club, 1315 Spruce St. Between the sessions, dinner will be served in the club dining room.

The Philadelphia District Committee, under the chairmanship of H. M. Hancock, Superintendent, Inspection Dept., The Atlantic Refining Co., was in charge of arrangements for the 1935 A.S.T.M. Regional Meeting and Group Meetings of Committees held in March and the committee has for some time been developing plans for the forthcoming January meeting. A most interesting symposium is in prospect and outstanding authorities will present papers. The program is as follows:

MANUFACTURED GAS—W. H. Fulweiler (Past-President, A.S.T.M.), Chemical Engineer, United Gas Improvement Co., and associates.
LIQUEFIED GASES—W. H. Bateman, President, Solgas, Inc. (subsidiary, Sun Oil Co.)
FUEL OIL—H. V. Hume, Combustion Engineer, The Atlantic Refining Co.
COAL AND COKE—A. C. Fieldner (Vice-President, A.S.T.M.), Chief Engineer, Experiment Stations Division and W. A. Selvig, Chemist, U. S. Bureau of Mines.

The papers have been prepared on the basis that they will have considerable comparative value and the speakers have conferred with each other in drafting an outline which will be applicable to each paper. Among the subjects which will be discussed in the papers are the following: Historical background, magnitude of the industry, future availability of raw materials, possibility of new processes, the tests which are applied to the materials, the significance of these tests, the utilization of the materials, the general economic aspects of the product and utilization.

Ample time will be available for discussing the papers both in the form of written discussion and from the floor. It is planned that the prepared discussion will be presented by individuals who are interested in the materials primarily from the standpoint of consumption.

The Philadelphia District Committee plans to send further detailed information of meetings to the A.S.T.M. members in the Philadelphia district and also to the members of local sections of national associations and societies to whom the subject is of particular interest. The subject is one of major industrial importance and with outstanding authorities in the various fields participating in the symposium, the meeting should be a most successful one. All A.S.T.M. members, whether located in the Philadelphia district or not, and their friends and associates are of course invited to be present.

Toughness of Tool Steels by the Charpy Impact Test

By N. Levinsohn[1] and R. L. Dowdell[2]

IN their paper[3] on torsion impact testing, Messrs. Luerssen and Greene indicate that with this method a carbon tool steel, having a carbon content of 1.06 per cent, shows increased toughness in the tempering range 350 to 400 F. and that Izod tests on both notched and unnotched specimens did not show this maximum toughness. The data resulting from their work and also that reported by Emmons[4] on this subject of toughness of tool sheets correlates with theories of strain removal in martensite during tempering and with the theory of tempering of austenite.

Some time ago, Charpy impact (transverse) tests were made on several tool steels and while the results seemed satisfactory, no attempt was made to investigate fully toughness in the low tempering range. The authors in presenting data from this current investigation wish to point out that the Charpy impact machine will show results in transverse and tension testing similar to those obtained by the torsion impact test.

Materials and Heat Treatment

The steels used were of the S.A.E. No. 1090 and No. 6150 types, respectively carbon and chromium-vanadium steels. The chemical compositions (per cent) were as follows:

Type	Carbon	Manganese	Phosphorus	Silicon	Nickel	Chromium	Vanadium
S.A.E. 1090.....	0.86	0.20	0.02	0.24	....	....	....
S.A.E. 6150.....	0.49	0.64	0.016	0.26	0.01	0.84	0.14

The bars used in the transverse Charpy test were forged from round stock 0.75 in. in diameter to 0.6-in. square bars. The No. 1095 steel was annealed at 1650 F. and the No. 6150 steel at 1740 F. All tempering was for 1 hr. at the temperature shown in the accompanying figures, which also indicate the water and oil quenching temperatures.

Specimens

The Charpy impact testing machine used in this investigation has a pendulum weighing 23.18 kg., and a capacity of 226 ft-lb. The transverse impact specimens were 1 cm. (0.394 in.) square and 2 in. in length. After forging, annealing, hardening and tempering the bars, a very soft grinding wheel was used to remove several thousandths inches of the material. After machining the specimens, notches were ground in with a commercial "cutting-off" wheel designated Alundum—Shellac, 80 N5L. They were $\frac{1}{16}$ in. thick.

The notches were 0.075 in. deep, which was considered sufficient to localize the stress and fracture. The grinding wheels give a practically constant radius at the bottom of the notch of 0.037 in. Since a large number of bars were prepared the results by this fast and inexpensive method were found to be satisfactory for the test. While the method of notching is not to be recommended where the highest possible precision is desired, for most transverse Charpy testing it appears to be within the accuracy of other variables encountered.

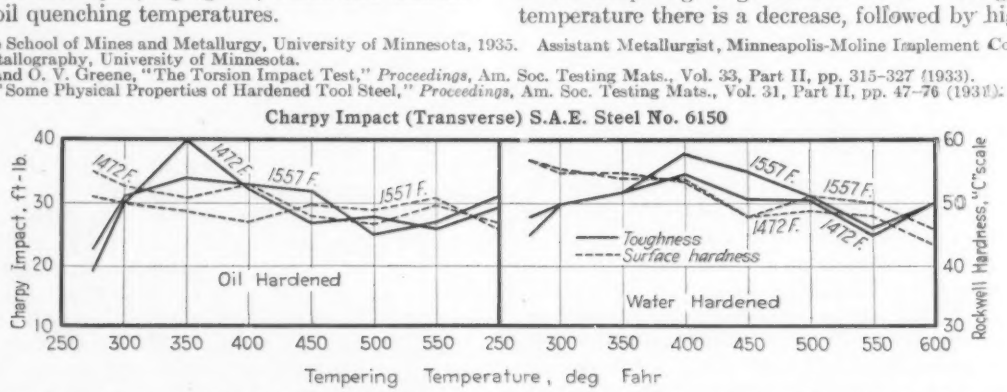
The specimens used in the impact tension tests were machined to 0.236 in. diameter from $\frac{3}{4}$-in. round annealed stock, followed by hardening and tempering. A 2-in. gage length was used.

The accompanying figures show the results obtained in the tests. In most cases only one determination was made for each point shown.

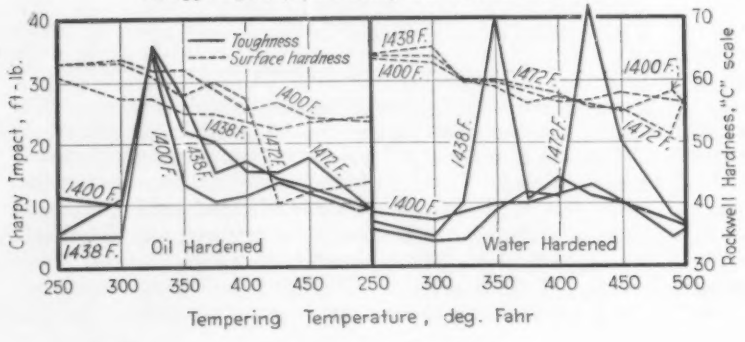
While there is ordinarily a gradual decrease in hardness with increased tempering temperature of hardened steels of the S.A.E. No. 1090 and No. 6150 types, the results given here show that Charpy impact toughness values obtained by transverse and tension tests are considerably increased in the tempering range 350 to 425 F. At higher tempering temperature there is a decrease, followed by higher values.

[1] Recent graduate School of Mines and Metallurgy, University of Minnesota, 1935. Assistant Metallurgist, Minneapolis-Moline Implement Co.
[2] Professor of Metallography, University of Minnesota.
[3] G. V. Luerssen and O. V. Greene, "The Torsion Impact Test," *Proceedings*, Am. Soc. Testing Mats., Vol. 33, Part II, pp. 315–327 (1933).
[4] J. V. Emmons, "Some Physical Properties of Hardened Tool Steel," *Proceedings*, Am. Soc. Testing Mats., Vol. 31, Part II, pp. 47–76 (1931).

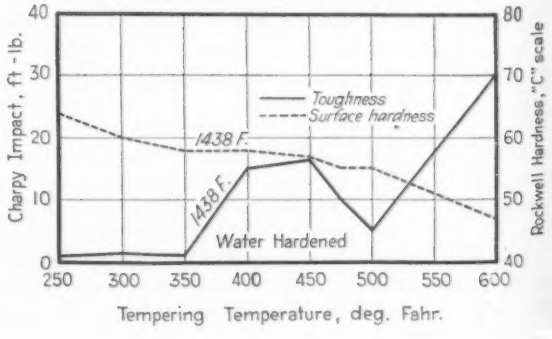
Charpy Impact (Transverse) S.A.E. Steel No. 6150



Charpy Impact (Transverse) S.A.E. Steel No. 1090



Charpy Impact (Tension) S.A.E. Steel No. 1090



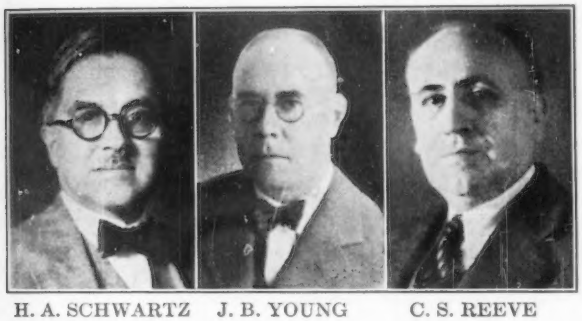
VII. Long-Time Society Committee Members

Seventh in the Series of Notes on Long-Time A.S.T.M. Members

THERE are given below outlines of the work of three long-time A.S.T.M. members, these notes being a continuation of the series of articles in the A.S.T.M. BULLETIN comprising reviews of outstanding activities of men who have been affiliated with the Society for 25 years or more and who have taken an active part in committee work. No definite sequence is being followed in these articles.

J. B. YOUNG, Engineer of Tests, Reading Co., with offices in Reading, Pa., received his technical education at the University of Pennsylvania from which he graduated in 1897, with the degree of B.S. in Chemistry. He has been employed since he became a member of the Society in 1907, by the company with which he is now affiliated, first, as Chief Chemist and then as Engineer of Tests. He has held this latter position since 1918.

Mr. Young has taken a very active part in Society work. His outstanding service has been in connection with the Committees A-1 on Steel and A-2 on Wrought Iron. He was secretary of Committee A-2 from 1912 to 1924 and served as vice-chairman of Committee A-1 from 1924 to 1926 when he became chairman, serving through the 1932 term. He was a member of Committee D-1 on Preservative Coatings



H. A. SCHWARTZ J. B. YOUNG C. S. REEVE

for Structural Materials for a number of years beginning in 1911 and his memberships on Committees A-3 on Cast Iron and A-4 on Heat Treatment of Iron and Steel began in 1921 and 1924 respectively. He was one of the original members of Committee D-11 on Rubber Products when it was organized in 1912 and served for ten years on this group.

At present, in addition to his other standing committee memberships he is also serving as a member of A.S.T.M. Committee E-10 on Standards.

He is active in the work of the American Railway Engineering Association, serving on its Rail and Water Service Committees and is one of the several members of the A.R.E.A. who has been appointed to represent this association on various A.S.T.M. standing committees.

H. A. SCHWARTZ, Manager of Research, National Malleable and Steel Castings Co., Cleveland, Ohio, received his technical education at Rose Polytechnic Institute, being awarded the degree B.S. in Electrical Engineering in 1901; M.S. in 1905; Ch.E. in 1931; and in 1933 was awarded the honorary degree of Doctor of Science. Following a brief period of service with the Louisville Railway Co., and as teacher at Rose, he entered (1902) the employ of the National Malleable and Steel Castings Co. (then the National Malleable Castings Co.). He was located in Indiana in various chemical and engineering capacities, becoming acting superintendent, and since 1920 has been Manager of Research, at the company's headquarters in Cleveland.

Doctor Schwartz has been a member of A.S.T.M. since 1907. He has been active in the work of Committee A-7 on Malleable Iron Castings and E-4 on Metallography, and since the organization of the Cleveland District Committee in 1932 he has been its chairman. One of his outstanding contributions to Society work was as a member of the committee in charge of the Symposium on Malleable Iron Castings developed in 1931 jointly by the Society and the American Foundrymen's Association.

Doctor Schwartz is a member of a number of engineering and related societies. In 1931 he was made an honorary life member of the A.F.A., and was the Penton Medalist. He has presented a large number of papers on metallurgical subjects and was author by invitation of papers for the French and Belgian Foundry Assns., the Czecho-Slovakian Engineering Society and the World Engineering Congress at Tokio. Doctor Schwartz is also a special lecturer in the Case School of Applied Science, Editorial Adviser, *Metals & Alloys*, and adviser on malleable iron for *The Foundry*.

C. S. REEVE, Manager of Research and Development, The Barrett Co., graduated from the University of Pennsylvania with the degree of B.S. in Chemistry. For three years after graduation he was Assistant Chemist with the General Electric Co. at Schenectady. Following this he was engaged on water softening problems for the Industrial Water Co. In 1904 he was employed by the Bureau of Surveys of Philadelphia and equipped and operated that city's first laboratory for testing asphalt paving materials. In 1906, he was appointed Assisting Inspector of Asphalt and Cement of the District of Columbia. In 1909 he was appointed to the Office of Public Roads, U. S. Department of Agriculture, and was engaged in testing and research on bituminous road materials. Since 1918, he has been connected with The Barrett Co. in directing research on coal tar products and bituminous materials.

Mr. Reeve has been a member of the Society continuously since 1904. His principal activities have been in connection with the work of Committee D-8 on Bituminous Waterproofing and Roofing Materials (he was one of the members when it was organized in 1905), Committee D-4 on Road and Paving Materials of which he is vice-chairman and Committee D-15 on Thermometers. He has been a member of the latter since its organization in 1921 and has been secretary beginning in 1926. He served four years as a member of Committee E-6 on Papers and Publications, from 1929 to 1933. Mr. Reeve also has been active for a number of years in the work of the Preservatives Committee of the American Wood Preservers Assn.

Committee for 1936 Marburg Lecture

The committee which will select the Edgar Marburg lecturer for 1936 has been appointed. Under the rules governing the lecture, this group consists of a member of the Executive Committee, a member of Committee E-9 on Research and a member of Committee E-6 on Papers and Publications. The personnel, representing the respective committees in the order named, is as follows: Hermann von Schrenk, *Chairman*, Consulting Timber Engineer; R. W. Crum, Director, Highway Research Board, National Research Council; and C. H. Mathewson, Professor of Metallurgy, Hammond Laboratory, Sheffield Scientific School, Yale University.

American Society for Testing Materials

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Number 77 **December 20, 1935**

The BULLETIN extends best wishes for a Merry Christmas and a Happy New Year.

Local Meetings

DETAILS are given on page 3 of this BULLETIN of two meetings to be held in January under the respective sponsorship of the Philadelphia and the Cleveland A.S.T.M. District Committees. The committees have been at work for some time developing the technical programs, which in Cleveland will cover pearlitic malleable iron and in Philadelphia, industrial fuels. Outstanding meetings are in prospect. Other local meetings will be sponsored early in 1936 by A.S.T.M. district committees in other centers.

Prior to 1924, the only formal meeting of the Society was the annual one and this aside from meetings of the standing committees, provided the only opportunity members had of getting together for technical discussions and contacts. In 1924, the first Group Meetings of Committees were initiated, and in 1930 the first Regional Meeting was held in Detroit. These so-called Regional Meetings have filled a real need in affording the members additional opportunity to discuss the many problems relating to engineering materials. They have been successful from the beginning and dovetail nicely with the activities of the group meetings.

In 1931 under the sponsorship of a number of the district committees several local meetings were held, in many of which sections and branches of other national organizations co-operated. All of these meetings were well attended and the papers and technical contributions were of much interest. During the depression years, relatively few meetings were held, but beginning with the meeting held in New York early this year there is renewed activity evident in the holding of local meetings.

The various district committees in planning their meetings are adopting as one major premise the fact that one or two outstanding meetings during the year will be most effective in achieving the desired objectives.

The district committees in holding local A.S.T.M. meetings accomplish several desirable ends. *First*, they give members in their localities a chance to get together and establish helpful contacts both of a business and social nature. *Second*, the Society's purpose in promoting knowledge of materials, is advanced by the technical programs which provide for presentation of papers and addresses by leading technologists. *Third*, the meetings give the members an opportunity to bring their associates and guests who are interested in materials and to acquaint them with the work the Society is doing in the engineering materials fields.

All of these functions are important ones and deserve the support of the respective local members. They provide a large proportion of the members with an opportunity to take part personally and more actively in the Society's work.

On Using Our Publications

THE Society takes a just pride in both the content and form of its publications. Supplying to the membership this growing volume of technical matter on materials, is the main item of expense in the Society's annual budget.

As the scope of the Society's interests in the materials field has broadened from year to year, these records of scientific and technical advance have increased correspondingly in diversity and in volume.

The wide interests of many of our individual members embrace a considerable number of the Society's varied projects. The particular activities of other members confine their interests within a much narrower range. To the first group a large portion of our published matter is of lasting interest. To the latter, and probably the larger group, interest is limited to what is printed on one or two special subjects.

Time and effort go into the preparation of the matter which it is found possible to include in the published *Proceedings* of the Society. Many of the contributions in our publications are of great permanent worth. Others, reflecting as they do the present state of development in materials engineering, lose value rapidly and in a short time, like last year's daily papers, are of use largely for historical purposes.

As tools for use in the daily work of laboratory and office, we are coming more and more to the convenient pamphlet compilations issued by the various committees of the Society to meet group needs. It is reasonable to expect that more than one member keeps his bound *Proceedings* fresh, clean and unused like the "uncut" trophies of the book collector. Considering the transient value of so large a part of all scientific and technical writing, is not this a mistake?

How much could be accomplished in furthering the main purpose of the Society, the promotion of knowledge of the materials of engineering, if these inactive publications were put to work promptly among our associates and others, and *worn out in service.*

H. S. Vassar

President

Acorns and Oaks and Research

ANNOUNCEMENT is made in this issue of a test program involving the determination of effect of speed of testing on concrete, being carried out at the University of Illinois, through a cooperative agreement between the University and the Society. The A.S.T.M. is contributing $600 from its Research Fund for the investigation and the University is supplementing this by contributing materials, procurement and use of special instruments and the like. This field is one in which there is little current research under way and the resulting data will be of value and importance.

Little mention has been made of the A.S.T.M. Research Fund, particularly in recent years, and many of our members may not be entirely familiar with it. A few statements regarding it should accordingly be in order. From the review of A.S.T.M. research activities appearing in the October A.S.T.M. BULLETIN the members will have appreciated the extent of our research work. In all there are now some 120 separate and distinct projects being carried on under Society auspices. For the most part this work is made possible through the interest and support of our hundreds of members engaged in Society committee work, the support taking the form of contributions of time, material and services, laboratory facilities and in many cases direct financial contributions. These services, freely given, have added immeasurably in the promotion of knowledge of materials.

In 1927 the Executive Committee gave careful consideration to the establishment of an A.S.T.M. Research Fund, the income from which might be used effectively in supporting certain investigational work. It was realized that committees would need to continue to finance specified investigations but the work could be strengthened if there were some funds available which could be used to support suitable projects.

Accordingly, the Executive Committee set aside $1000 as a modest beginning and further adopted the policy that half of the entrance fees of new members should be added to the fund. It was expected when the fund was started that it would grow steadily, this expectation being based on the growth of membership and the hope that it would be supplemented by contributions which might be expected from other sources.

Since its establishment, allotments from the fund have been made to further various research projects and these sums, while necessarily small, have been used effectively. No allotments from the fund are made unless recommended by the Society's Committee on Research.

Members of course are familiar with the fact that the Society's Committee E-9 on Research which at present comprises Messrs. P. H. Bates, R. W. Crum, H. W. Gillett, J. S. Miller, Jr., H. E. Smith and C. L. Warwick, *Ex-officio*, has in general the task of keeping a watchful eye on the Society's progress in "promoting the knowledge of materials." Broadly, the committee considers means by which this work may best be advanced; stimulates investigations for this purpose; seeks to bring about studies of properties of materials concerning which information is badly needed; and it reviews annually the progress of Society research activities.

The A.S.T.M. Research Fund will continue to grow steadily and in time should reach such a proportion that contributions from it may be larger and the results of research be of still greater value. From its modest beginning, it has grown to approximately $8000 which from the standpoint of figures alone seems a rather insignificant sum. Yet it is the carefully nurtured nucleus of what is hoped will become some day a far-reaching force in promoting the research phase of the Society's purpose. Hence the title of this article.

Proceedings Being Published

The printing of the *Proceedings* of the 1935 annual meeting will shortly be an accomplished fact and it is expected that within the very near future the volumes will be ready for shipment to each member. As in previous years, the volumes are being issued in two parts, Part I covering Committee Reports; Part II, Technical Papers.

In Part I of the 1935 *Proceedings* there are given the extensive annual reports of 39 A.S.T.M. standing committees and joint and sectional committees. A considerable portion of this extensive volume, which comprises 1500 pages, consists of the 136 new or revised tentative standards approved in 1935. For convenience, Part I also gives in their latest form the proposed revisions of standards which are now pending. A number of the committee reports contain voluminous data and information obtained from extensive test or research programs undertaken by the committees. This is especially true in the case of the committees carrying out corrosion investigations. The Report on Exposure and Corrosion Tests of Die-Cast Metals and Alloys comprising upwards of 40 pages was not preprinted nor was the Appendix to the Report of Committee C-9 on Concrete and Concrete Aggregates comprising a paper on "Comparisons of Different Types of Specimens for Compression Tests of Mortars" prepared for the committee by H. J. Gilkey and H. Walter Levitt. This part of the *Proceedings* also includes the annual address by the President, Hermann von Schrenk, the report of the Executive Committee and the Summary of the Proceedings.

The 37 technical papers which were presented at the annual meeting in Detroit comprise Part II. This 800-page volume also includes the Edgar Marburg Lecture on "Aircraft: Materials and Testing" and the Symposium on Spectrographic Analysis which comprises six technical papers and extensive discussion. Excluding the papers in this latter symposium, fifteen relate to ferrous and non-ferrous metals, six to cement, concrete, ceramics and masonry materials and 16 cover problems involving soils, aggregate, flooring materials, oil consumption, timber and electrical testing. It was not possible to preprint in advance of the meeting a number of papers and these are published in the *Proceedings* for the first time. Members will undoubtedly find a number of these of much interest and the interesting and informative discussion of the papers of course adds to the value of Part II.

Report on Caustic Embrittlement

As the result of an investigation conducted under a cooperative agreement between the Joint Research Committee on Boiler Feed Water Studies and the United States Bureau of Mines, carried out at the Non-Metallic Minerals Experiment Station of the Bureau of Mines, maintained in cooperation with Rutgers University at New Brunswick, N. J., Progress Report No. 7 has been issued. This report, entitled "Effect of Solutions on the Endurance of Low-Carbon Steel Under Repeated Torsion at 482 F. (250 C.)," describes a new method of testing steel under exposure to solutions such as may be encountered in boilers. The report is considered an important contribution toward progress in making available additional information on the subject of caustic embrittlement in boilers.

Through the courtesy of The American Society of Mechanical Engineers, one of the sponsors of the joint committee, a number of copies of the report have been furnished A.S.T.M. and members of the Society who may be interested in procuring a copy may do so by writing A.S.T.M. Headquarters.

1936 Annual Meeting Plans

At the recent meeting of Committee E-6 on Papers and Publications, plans for the technical program at the 1936 annual meeting in Atlantic City, June 29–July 3, were considered. The committee had before it a number of suggestions for papers, and an interesting program is in prospect.

The tentative plans call for an opening session similar to the one held in Detroit this year for the first time. Members will recall that at the opening session the President's address was presented and a most interesting paper was given by Dr. C. F. Hirshfeld, Chief of Research Dept., The Detroit Edison Co., on the subject "Relation of Specifications to the Engineering Profession." This year it is planned again to have some outstanding engineering authority present in the opening session a paper on a subject of interest to a large proportion of the membership.

Symposium on X-ray Crystallography and Radiography

The outstanding feature of the technical program is to be a Symposium on X-ray Crystallography and Radiography which is being developed by Subcommittee VI on X-ray Methods of A.S.T.M. Committee E-4 on Metallography. Dr. R. F. Mehl, Director, Metals Research Laboratory, and Head, Department of Metallurgy, Carnegie Institute of Technology, who is chairman of Subcommittee VI is in charge of the symposium and working with him are a number of authorities in this field including Dr. H. H. Lester, Research Physicist, Watertown Arsenal.

Plans for this symposium have been under way for over a year. Preliminary sessions were held at the June meeting in Detroit at which many technologists in this field presented discussion and material which it is planned will be the basis of the formal symposium. The object of the symposium is to present summary accounts of the present status of X-ray methods in the testing of materials so that the practical usefulness of such methods may be evaluated. The following items elaborate this general statement:

(*a*) To describe modern methods and equipment in an elementary way in order to assist industries in the application of X-rays to their work.

(*b*) To present as many case histories of successful applications as possible.

(*c*) To compare the usefulness of X-ray methods with the usefulness of other methods which may be used alternatively.

(*d*) To include the application of radiographic and diffraction methods to both metallics and non-metallics.

In all, it is planned that there will be twelve papers comprising the symposium—six covering radiography and six diffraction. Doctor Lester is in charge of the development of the program involving the former, while Doctor Mehl is directing the section on diffraction.

In the section on radiography there will be papers on such subjects as elements of radiography, foundry applications, applications to the welding art, gamma ray radiography and its relation to X-ray radiography and the problems of specifications.

The diffraction section will comprise contributions on equipment and methods, constitution of alloys, chemical analysis and particle size determinations, non-metallic applications, and cold-work, recrystallization and preferred orientations. All of these papers will be presented by technologists who for a long time have been closely in touch with this growing field and each of them will emphasize the practical phases of the respective topics.

Tentative plans call for a symposium of two days' duration, but more complete information on this and other details of this outstanding technical feature will be given in future BULLETINS.

Other Technical Features

A number of other technical features are under consideration for the meeting including a suggestion that there be developed a symposium on significance of tests for rubber products and correlation of physical tests with service tests. These topics are now under consideration in the appropriate A.S.T.M. standing committees to which they may be referred for development if they are to be included in the program.

A number of technical papers have already been considered by Committee E-6 and it is expected a number of others will be offered in the near future as a result of the committee's invitation (see page 9). Topics on which papers are being considered cover shrinkage of concrete, an investigation of failure of heat-treated bridge wire, fire tests of doors, testing of hard-drawn copper cable, designing asphalt paving mixtures, and other pertinent subjects.

Further details of annual meeting features will be given in forthcoming issues of the BULLETIN and it is expected that the Provisional Program will be included in the April issue.

Research on Testing Speeds at Illinois

For some time, A.S.T.M. Committee E-9 on Research has been considering the desirability of sponsoring investigational work on the effect of speed of testing various materials. This work is of interest to a number of Society committees and in particular to the Section on Speed of Testing of Committee E-1 on Methods of Testing. In the field of masonry materials, concrete, cement, etc., there is very little research work under way aside from activities being carried out under the sponsorship of Committee C-1 on Cement involving inter-laboratory studies on the relation between speed of testing and strength of mortar specimens. This situation has left practically the entire field open for study and as a result of conferences held by Committee E-9 a cooperative agreement has been arranged between the A.S.T.M. and the University of Illinois, whereby a series of tests on the effect of speed of testing on the strength and elastic properties of concrete will be made.

The first studies will be confined to compression tests of concrete, using a rather wide variety of testing speeds. It is planned to use concretes having compressive strengths of 2000, 3500 and 5000 lb. per sq. in. For the tests with rapid loading, both deformations and loads will be recorded by autographic devices, thus providing data regarding the load-strain relations for the various test conditions. Particular attention will be given to the elastic and plastic properties of concrete, as revealed by the tests.

The Society is contributing financial support to the work from its Research Fund. The work itself will be under the direction of Prof. F. E. Richart of the University of Illinois, assisted by an Advisory Committee of the Society consisting of M. O. Withey, Professor of Mechanics, University of Wisconsin; P. G. McVetty, Mechanical Engineer, Research Labs., Westinghouse Electric and Manufacturing Co.; and D. E. Parsons, Chief, Masonry Construction Section, National Bureau of Standards. All of these men are members of the Section, of Committee E-1, on Effect of Speed of Testing and Mr. McVetty is chairman of the section.

Book of Tentative Standards Largest Yet

The 1935 Book of A.S.T.M. Tentative Standards which has just been published and distributed to those who ordered copies exceeds by far, in number of pages, any previous edition. In fact it has more pages than any single publication of any kind yet issued by A.S.T.M. There are 1591 pages in the book as compared with 1257 last year. The reason for the great increase is due of course to the large number of new tentative specifications and tests approved during the year.

Of the 290 specifications, tests and definitions given in their latest approved form, 48 relate to ferrous metals; 29 to non-ferrous metal products; 54 apply to cementitious, ceramic, concrete and masonry materials; 143 cover such materials as paints, petroleum products, textiles, rubber products, insulation and many others; and the remaining 16 are general testing methods applicable to these materials. In addition, all proposed revisions in standards are given.

What makes this publication of special significance and value is not its large number of pages, but the fact that it is the *only* publication which gives *all* of the tentative standards.

To make the publication of maximum usefulness and so that any one of the large number of tentative standards can be found easily, there are provided—*first*, a very complete subject index; *second*, one table of contents listing all items under appropriate subject headings (the standards are grouped in the volume according to materials covered); and *third*, a second table of contents listing all specifications and tests in the order of number sequence of the serial designations.

In order that members may have clearly in mind what the publication covers, a complete table of contents is enclosed with this BULLETIN. A convenient order blank, listing the special price to members, is also included.

Offers of Annual Meeting Papers

In the Circular to Members No. 233 which was mailed to each member on December 2, the customary invitation was extended to offer papers for presentation at the 1936 annual meeting in Atlantic City on subjects relating to the properties and testing of engineering materials.

In order that as many as possible of the technical papers and committee reports can be preprinted in advance of the meeting, it is desirable that the program be developed early. Committee E 6 on Papers and Publications has fixed February 15 as the limiting date for receipt of offers but members who may be considering the submission of a paper are urged to send their offers to A.S.T.M. headquarters *as soon as possible*. Suitable blanks which should be used in sending the necessary information with respect to the offer of a paper can be obtained from Society headquarters. Each offer must be accompanied by a summary of the proposed paper in such detail that its scope is clear and also to point out features that in the author's opinion make the paper a desirable one for presentation and discussion.

Invitations to submit papers are not limited to A.S.T.M. members, many outstanding technical contributions to our *Proceedings* having been made by men who were not affiliated with the Society.

The Committee on Papers and Publications in its review of the papers offered endeavors to develop a balanced technical program. The committee welcomes suggestions of pertinent subjects from members who may not themselves wish to offer papers.

Schedule of Meetings

Date	Committee	Place
January 22–23	Executive Committee	Philadelphia
January 23–24	D-2 on Petroleum Products and Lubricants	New York City
January 21–22	Subcommittees of Committee A-1 on Steel	Philadelphia
January 21	Philadelphia District Meeting	Philadelphia
January 27	Cleveland District Meeting	Cleveland
March 4	Regional Meeting	Pittsburgh
March 2–6	Spring Group Meetings of Committees	Pittsburgh
June 29–July 3	Annual Meeting	Atlantic City

Washington Meeting of Committee C-1

Committee C-1 on Cement held a well-attended meeting at the National Bureau of Standards in Washington on December 3. Many of the members and visitors present at the series of committee meetings were in Washington attending the annual meeting of the Highway Research Board.

The Subcommittee on High-Early-Strength Cements presented a summary of an extensive series of tests which are under way and as a result of its recommendations Committee C-1 approved, subject to letter ballot, for submission to the Society certain revisions in the present Tentative Specifications for High-Early-Strength Portland Cement (C 74 – 30 T). In addition to minor changes the revisions include a specific surface fineness requirement and also optional strength requirements. The optional tensile strength requirements are the same as those now in effect, and the optional compressive strength requirements are based on plastic mortar tests made according to the present Tentative Method of Test for Compressive Strength of Portland-Cement Mortars (C 109 – 34 T). There was also approved, subject to letter ballot, a suggested tentative standard for high-early-strength treated portland cements.

The Subcommittee on Plastic Mortar Tests reviewed recently completed studies and also presented for consideration suggested changes in method and in apparatus tolerances. This investigation is being actively carried on by the subcommittee with the hope that further improvements can be made in the method. No action was taken at the meeting, however, regarding the present tentative method (C 109 – 34 T).

The Subcommittee on Volume Change and Soundness of Portland Cement submitted a progress report briefly outlining the results of some of their extensive tests to date, summarizing the principal indications of the data thus far available and presenting an extensive bibliography on the soundness of cement. Other progress reports were presented.

Doctor Insley of the Bureau of Standards described a technique for the microscopic examination of polished and etched sections of cement clinker by means of reflected light. The application of this method to the study of low-heat clinker for use in Boulder Dam revealed important differences in structures in clinker from different plants.

The always interesting subject of fineness of cement received considerable attention, particular interest being expressed in some of the recent comparative tests among laboratories using turbidimeters, and some of the variables incidental to the study of sub-sieve fineness.

Educational Representation in A.S.T.M.

Large Number of Schools Have Memberships

THE 1924 *Proceedings* included a most interesting paper on "How Shall the Benefits of A.S.T.M. Standardization be Secured to the Small User?" When this paper was presented, an outstanding executive in the materials field in discussing the paper suggested that the use of A.S.T.M. standards could be promoted very effectively by educating the educators. Such a statement is rather startling in view of the intimate interest of college men in the work of the Society from its very inception. In fact, the time of the annual meeting is fixed partly so as to fit in with the academic year and to permit engineering faculty members to take part in the Society's deliberations.

Having in mind the large interest of education in our work, the accompanying list has been prepared of educational institutions which are represented in the Society either through a departmental membership, such as Department of Civil Engineering, Chemical Engineering, etc., a library membership where the library is listed as the member, or an individual member. The list of schools given will no doubt be of interest to many A.S.T.M. members. Needless to say, the Executive Committee is always interested in extending this list and bringing the work of the Society to the attention of schools not now represented.

Along similar lines it is of interest to note the widespread use being made of Society publications in classroom work. In the October BULLETIN it was announced that 32 students at Pratt Institute had joined the Society as student members and were obtaining at the special student prices copies of the Book of A.S.T.M. Standards to use in certain courses. A similar procedure is in effect at Ohio State University. A large number of engineering schools use the special compilation of Selected A.S.T.M. Standards for Students in Engineering in connection with their courses in mechanics of materials, testing laboratory work, etc., and widespread use is made of other books which the Society has issued in recent years including the compilations of Standards on Textile Materials, Petroleum Products and Lubricants, Coal and Coke, Refractory Materials, Tentative Recommended Practice for Metallographic Testing of Ferrous and Non-Ferrous Metals, and others.

It is believed that the increasing use of A.S.T.M. publications in educational work will be of mutual benefit to the student, who will learn the utility of authoritative specification requirements and tests developed by the time-tested A.S.T.M. procedure and the value of data resulting from Society sponsored researches, and to the Society, which is desirous that the results of its standardization and research work be applied as widely as possible.

The following table lists the colleges and universities in the United States and Canada having departmental or individual memberships in A.S.T.M. The names are in alphabetical sequence based on the principal word in the title.

School	Departmental or Library	Individual
University of Akron	L	..
University of Alabama	1	..
Alaska Agricultural College	1	..
University of Alberta	..	2
Antioch College	L	..
University of Arizona	L	..
University of Arkansas	1	..
Armour Institute of Technology	L	3
University of British Columbia	L	..
Brooklyn Polytechnic Institute	..	2
Brown University	1	..
Bucknell University	1	..
University of California	L	6
California Institute of Technology	1	1
Carnegie Institute of Technology	1	3
Case School of Applied Science	..	3
University of Cincinnati	L	1
Clemson Agricultural College	L	..
Colorado Agricultural College	1	..
Colorado School of Mines	L	..
Columbia University	1	3
Connecticut Agricultural College	1	..
Cooper Union Institute of Technology	..	2
Cornell University	1, L	4
University of Dayton	..	1
University of Delaware	1	1
University of Detroit	1	..
Drexel Institute	L	1
Duke University	L	..
Franklin and Marshall College	..	1
Georgia School of Technology	L	2
Gettysburg College	..	1
Harvard University	..	3
University of Idaho	1	..
University of Illinois	L	15
State University of Iowa	L	1
Iowa State College of Agriculture and Mechanic Arts	..	7
Johns Hopkins University	..	3
Kansas State Agricultural College	1, L	1
University of Kansas	L	..
Lafayette College	1, L	..
Lehigh University	..	3
Lewis Institute	..	1
Louisiana State University and Agricultural and Mechanical College	1	..
University of Louisville	1	1
Lowell Textile Institute	..	1
University of Maine	1	..
University of Manitoba	L	..
Marquette University	1	..
University of Maryland	..	1
Massachusetts Institute of Technology	1	16
McGill University	..	2
Michigan State College of Agriculture and Applied Science	L	..
University of Michigan	1, 2 L's	12
University of Minnesota	3 L's	4
Mississippi State College	1	..
Missouri School of Mines	L	..
University of Missouri	L	..
University of Nebraska	..	1
University of Nevada	..	1
University of New Hampshire	..	1
New Mexico College of Agriculture and Mechanic Arts	L	..
College of the City of New York	1	2
New York State College of Ceramics	1	..
New York University	..	1
North Carolina State College of Agriculture and Engineering	1	..
University of North Carolina	L	..
University of North Dakota	..	1
Northeastern University	1	..
University of Notre Dame	L	..
Ohio State University	1, L	5
Oklahoma Agricultural and Mechanical College	L	..
Oregon State Agricultural College	L	1
Pennsylvania State College	..	4
University of Pennsylvania	..	3
Pratt Institute	..	1
Princeton University	L	..
Purdue University	L	3

(*Continued on next page*)

Textile Committee Meets

The series of fall meetings of A.S.T.M. Committee D-13 on Textile Materials were held at the Hotel New Yorker extending over three days, October 16–18. A large number of subcommittees met and these meetings together with the main committee meeting and banquet were considered most successful ones. Considerable progress was made in the committee's active and extensive program of work.

A feature of the meeting was a home economics symposium in which various home economists discussed textile testing standards, particularly from the consumer's viewpoint. In addition, several papers were presented at certain of the subcommittee meetings.

The principal speaker at the banquet, the toastmaster of which was Mr. Ephraim Freedman, Director, Macy Bureau of Standards, R. H. Macy and Co., Inc., who also was in charge of the local committee making arrangements for the meetings, was Dr. R. W. Webb, Senior Cotton Technologist, Bureau of Agricultural Economics, U. S. Department of Agriculture, who gave an interesting account of a six weeks' trip abroad during which he visited a number of laboratories and mills.

A list of the papers presented during the meeting follows:

The Attainment of the Perfect Cloth Through the Proper Correlation of the Results of Tests on Gray Yarn and Cloth and the Final Finished Fabric—George Fuller, Cox & Fuller

Formation and Microscopic Structure of Cellulose Membranes with Particular Reference to Cotton Fibers—Wanda K. Farr, U. S. Department of Agriculture

Calibration of the Incline-Plane Testing Machine—R. S. Cleveland, National Bureau of Standards

The New and Expanded Federal-State Coordinated Cotton Research Program—H. W. Barre, U. S. Department of Agriculture

Résumé of a Seven-Year Series of Studies on Silk and Synthetic Fabrics—Pauline Beery Mack, Pennsylvania State College

How Can Results of Fading Tests be Expressed—Dorothy Nickerson, U. S. Department of Agriculture

Results of a Questionnaire on Textile Test Methods Needed by Teachers of Home Economics—H. J. Ball, Lowell Textile Institute

More Work for D-13—Standard Test Methods Needed for Consumer Fabrics—Ruth O'Brien, U. S. Department of Agriculture

Serviceability Tests on Fall and Winter Dress Fabrics—Dorothy Saville and Ethelwyn Dodson, United States Testing Co., Inc.

As a result of discussion in the D-13 Advisory Committee, it has been decided to hold the 1936 March meeting in Washington. Among the features of this meeting will be a Symposium on Wool. Tentative plans were made also for a Symposium on Rayon at the October, 1936, meetings and at the March, 1937, meetings it is planned to hold a Symposium on Humidity.

The committee also gave consideration to the expansion of its work in the field of simplified practice, since the committee's efforts toward eliminating sources of confusion, as exemplified recently by the establishment of the terms "S" and "Z" for the directions of twist in yarns and the Typp system for numbering woolen and worsted yarns, have been very helpful. In addition to the need for a standard method of designating the weight of fabrics, it was pointed out that the work should include the establishment of standard definitions for fabric names.

In the field of cotton yarn and threads, revisions of three of the standards are in progress and an attempt is to be made to set up a general methods standard to which reference could be made where feasible in other specifications and tests.

The committee is planning an inter-laboratory testing program to determine the part played in calibration by variations in testing machine speed; also the relative value of grab and strip tests. Detailed discussion took place on the "Recommended Commercial Standard for Woven Dress Fabrics—Testing and Reporting." Certain differences between D-13 standards and those developed by the Division of Trade Standards, National Bureau of Standards, are to be taken up through the appointment of a D-13 representative.

The Subgroup on Wool reported it had carried out studies on two sets of wool standards by means of the new methods of test for fineness of wool and the value of the new methods was demonstrated by finding three or four grades that were "out of line." Studies on methods of test for staple length and number of crimps in wool are to be undertaken. In a long session of the Section on Felt, all the methods of test for wool felt were studied in detail. A number of revisions were suggested and each of the methods is to be submitted to a series of laboratory checks.

The Subcommittee on Asbestos will submit to letter ballot a number of revisions in the test methods in its charge involving various types of asbestos, and it was pointed out at the meeting that in view of the world shortage of non-ferrous asbestos fiber, efforts should be made to produce fiber to meet performance requirements rather than iron content requirements.

The Section on Humidity has an active program confronting it involving an analysis of present commercial and laboratory methods of measuring moisture regain and the establishment of regain values when needed for specific materials as a basis for commercial transactions. The Research Council of the U. S. Institute for Textile Research has asked the committee to secure definite information on the hygroscopic properties of textiles and the effects of variations from true equilibrium on the properties under test.

Educational Representation

(*Concluded from facing page*)

School	Departmental or Library	Individual
Rensselaer Polytechnic Institute	L	3
Rhode Island School of Design	..	1
University of Rochester	L	..
Rutgers University	2	1
University of Saskatchewan	L	1
South Dakota State School of Mines	L	..
Stanford University	L	1
Stevens Institute of Technology	L	..
Swarthmore College	1	..
Syracuse University	1	1
University of Tennessee	..	1
Texas Agricultural and Mechanical College	2	..
Texas Technological College	1	..
University of Texas	1	..
Tufts College	1	1
Tulane University of Louisiana	1	..
University of Tulsa	..	1
Tuskegee Institute	..	1
Union College	..	1
University of Utah	..	1
Vanderbilt University	L	..
Virginia Military Institute	1	..
Virginia Polytechnic Institute	1	..
Washington and Jefferson College	..	1
State College of Washington	L	..
Washington University (St. Louis)	..	3
University of Washington (Seattle)	..	1
West Virginia University	..	2
University of Wisconsin	L	5
Worcester Polytechnic Institute	1	..
Yale University	..	3

Field Tests for Specific Gravity, Unit Weight and Voids of Concrete Aggregates

By J. C. Sprague[1]

IN designing concrete mixtures it is desirable (and necessary if assurance of accuracy is to be had) to deal with the materials on an absolute volume basis. When working on this basis the specific gravities of the constituent materials are the essential factors. Since, however, it is the usual practice also to determine the unit weight and percentage of voids of the aggregates, it is a comparatively simple matter to check the inter-relationships of all three characteristics.

If the specific gravity alone is determined, the accuracy of the result will depend on the sensitivity of the apparatus used to make the test, and on the personal equation introduced by the operator. A check test may be made by another operator and if the results are the same (or nearly so) it may be assumed that the determination is correct. However, if there is no one available to make a check test the operator must depend on some other method for checking his results. A convenient and accurate means of doing this is by checking the inter-relationship between the specific gravity, unit weight and percentage of voids of the aggregate. Thus we have a relationship between these three physical characteristics of aggregate, as follows:

$$62.4\ VS = 62.4\ S - W$$

where V = percentage of voids in the material
S = specific gravity of the material
W = unit weight of the material per cu. ft.

In the design of concrete mixtures either true or apparent specific gravity may be used. It is preferable to use apparent specific gravity, however, since it is more direct and convenient. In order to use true specific gravity it is necessary to make a correction for the percentage of absorption of the aggregate. An example will serve better to clarify this.

Suppose we are using 100 lb. of a sand, the apparent specific gravity of which is 2.58, true specific gravity 2.63, and absorption 0.75 per cent. If we divide 100 by the apparent specific gravity times weight of water (62.4) we obtain 0.621 cu. ft., which represents the actual volume occupied by the particles with the pores sealed. On the other hand if we use the true specific gravity, the result will be a volume of 0.609 cu. ft., which is the absolute volume of the solid rock matter in the 100-lb. sample—that is, the first result (0.621) less the volume of pore space within the aggregate particles. If we now add to 0.609 cu. ft. the volume of pore space (volume of water absorbed $= \frac{100 \times 0.0075}{62.4} = 0.012$ cu. ft.), we have exactly the same result in either case. Hence $0.609 + 0.012 = 0.621$.

If, by applying the above equation, or a variation of it, $(62.4\ VS) - (62.4\ S - W) = 0$, one side of the equation sign does not equal the other side (or zero), it immediately becomes evident that there is an error in one or more of the values obtained. (It will be noticed that the weight of water per cubic foot is assumed as 62.4 lb. and it is assumed that this weight will be checked before any of the above determinations are made.) If the error is less than 1 per cent it may be considered as being within reasonable limits and a correction made for the unit weight since this characteristic is more subject to error of measurement than either specific gravity or voids. On the other hand if the individual determinations do not check within reasonable limits in their inter-relationship, check tests should be made on each to determine where the error lies.

This equation also comes in handy for determining any one of the physical characteristics when the other two are known. Suppose, for instance, that we had accurately determined the unit weight and percentage of voids of a given material and wanted to know the specific gravity in a hurry, but did not have the necessary apparatus at hand. The specific gravity could be calculated as follows:

$$S = \frac{W}{62.4 - 62.4\ V}$$

In working with fine aggregate, where the unit weight is determined in accordance with the A.S.T.M. Standard Method of Test for Unit Weight of Aggregate for Concrete (C 29 - 27)[2]—identical with A.A.S.H.O. Tentative Method T-19, and the voids in accordance with A.S.T.M. Standard Method of Test for Approximate Percentage of Voids in Inundated Fine Aggregate (C 69 - 30),[3] trouble may be encountered in making the individual determinations check in their inter-relationship. This is because fine aggregate, when compacted in the standard manner, is not generally as compact as inundated fine aggregate. In order to compare the unit weight of such a material with its void content, and both values in relation to the specific gravity, it is necessary that the same degree of compaction be obtained in each case. The unit weight of the inundated sand (minus the water), in which the voids have been determined (A.S.T.M. C 69 - 30), may be calculated as follows:

$$W = \frac{28{,}317\ \frac{W_s}{400}}{453.59}$$

where W = unit weight of fine aggregate
W_s = weight (in grams) of fine aggregate used in A.S.T.M. test C 69 - 30.

The inter-relationship of the three physical characteristics discussed in the foregoing has significance in that it definitely ties the values together for granular materials of a given degree of compaction. As soon as the degree of compaction changes, the unit weight and the percentage of voids change, one value varying inversely with the other.

[1] Assistant Engineer, U. S. Engineers, Huntington District, Hogsett, W. Va.
[2] 1933 Book of A.S.T.M. Standards, Part II, p. 247.
[3] *Ibid.*, p. 250.

A.G.A. Booklet

The 1935 report of the Laboratories Managing Committee of the American Gas Assn. is a 40-page booklet commemorating the tenth anniversary of the A.G.A. testing laboratories program. The report entitled "For the Benefit of the American Gas Industry and 63 Million Gas Consumers" covers the extensive work carried out by the laboratories and indicates methods of developing and applying national industrial and consumer standards to the benefit and progress of industrial endeavor. Copies of this booklet are available for distribution from the laboratories, 1032 E. Sixty-second St., Cleveland, and also from the Association Headquarters, 420 Lexington Ave., New York City.

Meeting of Committee on Brick

An exceptionally well-attended meeting of A.S.T.M. Committee C-3 on Brick was held on November 14 at the National Bureau of Standards, Washington. A large number of committee members were present as well as many visitors and guests interested in the work. One of the important actions taken was the decision to appoint a special committee to study the proposed reorganization of the subcommittee structure.

Extensive discussion took place of the committee's standardization work. It was decided to select a special subcommittee to draw up specification requirements for glazed enameled brick. The value of different caps used in preparing brick for test was considered and it was generally agreed that all laboratories should use the same material for capping. It was announced that considerable progress had been made on the work being done by the Bureau of Public Roads on paving brick and that the results of this work are to be assembled into a special report for the committee.

There was discussion at the meeting in connection with the weathering resistance clauses of the new Tentative Specifications for Building Brick (Made from Clay or Shale) (C 62 – 35 T). This discussion brought to light various viewpoints in connection with these specifications that would be helpful to the subcommittee in charge in studying possible revisions in the requirements. The committee decided to retain in the specifications the three grades of brick classified according to strength.

Committee C-3 has authorized the Subcommittee on Sewer Brick to prepare certain revisions in the specifications in its charge to be reported at the next meeting.

Gaseous Fuels Committee Launches Work

Preliminary preparations for productive action on the part of A.S.T.M. Committee D-3 on Gaseous Fuels were completed on October 14 at the second meeting of this newly organized standing committee held in Chicago in connection with the Seventeenth Annual Convention of the American Gas Assn. The meeting, which was presided over by the chairman, A. C. Fieldner, Chief Engineer, Experiment Stations Division, U. S. Bureau of Mines, approved the suggestions made by its advisory committee with respect to the following:

1. The selection of national authorities to comprise the membership of the seven subcommittees charged with the preparation of standards for the subjects in their domains.
2. The definition of objects and scope of work for each of the seven subcommittees.
3. The drafting of rules and regulations governing the procedure of the committee.

Feeling that there should be widespread participation in the formulation of its standards on the part of those interested in this work, the committee appointed to membership on its new subcommittees numerous national authorities and representatives of governmental, trade association and industrial organizations. Representatives of the National Bottled Gas Assn. and the Compressed Gas Manufacturers' Assn. will be among those taking part in the work. In conducting its standardization work the new committee intends also to cooperate fully with the current programs of the National Bureau of Standards in investigating gas analytical methods and with the American Gas Assn. Testing Laboratory in gas utilization research and standardization work.

As a result of this meeting the committee perfected its organization and developed subcommittee structure to initiate standardization work involving the following: (1) Collection of gaseous fuel samples, (2) measurement of gaseous fuel samples, (3) determination of calorific value of gaseous fuels, (4) determination of specific gravity and density of gaseous fuels, (5) determination of impurities of gaseous fuels, (6) determination of water vapor content of gaseous fuels, and (7) complete analysis or chemical composition of gaseous fuels. The committee has restricted all of its activities to "sampling and testing of gases where such gases are used as commercial fuels."

In order that there may be no overlapping of duties of the subcommittees, the committee approved an outline submitted by the secretary, R. M. Conner, Director, American Gas Assn. Testing Laboratory, covering the object, scope and special considerations of each group. The standardization activities of each group will include such items as selection of acceptable types of apparatus for the determination of properties to be covered, the development of methods of procedure, methods of calibrating such apparatus as may be required, the evaluation of corrections which may be necessary in the determinations, etc. Each subcommittee will have special considerations including the standardization of various terms, selection of suitable tolerances and proper allowances, etc.

Marburg Lecture Issued as Reprint

Because of the widespread interest in the 1935 Edgar Marburg Lecture on "Aircraft: Materials and Testing" delivered at the annual meeting in Detroit by Dr. L. B. Tuckerman, Assistant Chief, Division of Mechanics and Sound, National Bureau of Standards, it will be issued in separate reprint form, in addition to its inclusion in the 1935 *Proceedings*.

In his lecture Doctor Tuckerman points out that all fields of science and technology have contributed to the development of the modern airplane. The discussion in the paper, however, is limited to the field of relations between the mechanical properties of the material and the design of struts, beams, girders, stressed skin, etc., and the craft as a whole, to produce light-weight aircraft. The significance of light-weight construction, which is a major problem in aircraft, is discussed by comparing power-driven vehicles, locomotive, automobile, airplane and airship on the basis of their structural density, loads, etc. The significant properties: density, strength-density ratio and modulus-density ratio of selected materials are compared.

The lecture indicates that with the best current designs it is possible to make full use of the strength of materials now available only in relatively small parts of the aircraft structure. The modulus-density ratio is still the limiting property of the material and this ratio is practically unaltered by any treatment which can be given a material. The conclusion is drawn that no immediate radical improvement in light-weight construction is to be expected from increased materials strength but that there is much room for improvement in the knowledge of the possibility of designing to utilize more fully existing strength in materials.

Reprint copies of the lecture aggregating 44 pages are available to members at the special price of 35 cents each. The non-members' price is 50 cents per copy.

Reports on Effect of Temperature

It was announced in the October BULLETIN that certain progress reports which were to be presented at the meeting of the Joint A.S.M.E.–A.S.T.M. Research Committee on Effect of Temperature on the Properties of Metals, which was held in New York on December 5 in connection with the A.S.M.E. annual meeting, could be obtained by A.S.T.M. members from Headquarters. In addition to those two reports, three others were presented at the meeting and a copy of these will be sent to A.S.T.M. members on request.

For the information of the members, the titles of all of the reports which are available follow:

SEIZURE OF METALS AT ELEVATED TEMPERATURES AND METHODS OF TESTING FOR PROPENSITY TOWARD SEIZURE—N. L. Mochel

REPORT ON EXPERIMENTAL WORK ON STABILITY OF STRIP 18–8—A. C. Chamberlain

PROGRESS REPORT ON SHORT-TIME TENSILE TESTS ON 0.40 PER CENT C STEEL K-20 AT 850 F—J. B. Romer

PROGRESS REPORT ON LONG-TIME CREEP TESTS OF 18–8 AND 0.40 PER CENT C STEEL UP TO NOVEMBER 14, 1935—H. C. Cross and F. B. Dahle

COMPARISON OF HIGH-TEMPERATURE PROPERTIES OF LARGE CAST-STEEL AND WROUGHT-STEEL VALVES FOR HIGH-TEMPERATURE SERVICE—H. C. Cross and F. B. Dahle

Index to Standards Widely Used

As the number of A.S.T.M. specifications and tests becomes larger, the Index to A.S.T.M. Standards and Tentative Standards assumes greater importance and utility. The Index is being used more and more widely and during the current year many requests have been received for copies.

The forthcoming Index to Standards as of January 1, 1936, will be sent in the near future to each member. It gives under appropriate key words the titles of all Society standards and tentative standards together with exact page references to the current A.S.T.M. publications in which they may be found. Each standard is indexed under the principal subjects it covers. Those who do not know exactly where an A.S.T.M. specification appears can determine very quickly from the Index whether it is a standard or a tentative specification and find it readily from the information given. In addition to the listings under principal subjects covered, a special list gives all specifications and tests in the order of numeric sequence of the serial designation.

If members desire additional copies they can be obtained without charge from A.S.T.M. headquarters.

Plastering Committee Making Progress

While the Sectional Committee on Specifications for Plastering, jointly sponsored under A.S.A. procedure by the American Institute of Architects and A.S.T.M., has held no recent meetings, preliminary drafts of specifications have been prepared and circulated for criticism. Revisions have been made on the basis of comments on the preliminary drafts and a fourth draft is now in course of preparation, including much material subsequently made available.

The current draft of the proposed specifications includes the following sections:

General Conditions	Bonding Coats	Fiber Insulating Lath
Temporary Enclosures	Wood Grounds	Other Lath
Temporary Heat	Samples	Metal Corner Beads
Protections	Models	Metal Specialties
Patching	Ornamental Work	Plastering Materials
Cleaning up	Metal Furring	Gypsum Plastering
Guarantee	Metal Lath	Lime Plastering
Surface Verification	Wood Lath	Other Kinds of
Surface Preparation	Gypsum Lath	Plastering

Personals

News items concerning the activities of our members will be welcomed for inclusion in this column

L. E. EKHOLM, formerly Metallurgist, Harrisburg Pipe and Pipe Bending Co., Harrisburg, Pa., is now with Henry Disston & Sons, Inc., Tacony, Philadelphia, Pa.

B. L. MCCARTHY, Metallurgist, Wickwire Spencer Steel Co., was awarded the Wire Association Medal at the recent five-day meeting of that organization in Chicago, in recognition of his paper "Grain Size and Its Influence on the Manufacture of Steel Wire."

W. C. MASTERS, who was Technical Adviser, the American Institute of Bolt, Nut and Rivet Manufacturers, Cleveland, Ohio, is now with the Townsend Co., New Brighton, Pa.

DR. JOHN S. UNGER, long associated with the Carnegie Steel Co. and since 1908 Manager of the Central Research Bureau, recently resigned his position just prior to his eightieth birthday. He has been a member of A.S.T.M. for over 25 years and served on a number of standing committees.

C. C. CRANE is now connected with the Republic Steel Corp., Chicago, Ill., as Metallurgist. He was Chief Chemist, Keystone Steel and Wire Co.

R. L. KENYON, Supervising Research Engineer, The American Rolling Mill Co., has been placed in charge of all metallurgical work in the manufacture and development of wrought-steel wheels. Mr. Kenyon was recently elected a trustee of the American Society for Metals.

ALBERT SAUVEUR, Metallurgical Engineer, Professor of Metallurgy, Harvard University, was the chairman of the delegation representing the United States Government at the Seventh International Congress of Mining and Metallurgy and Applied Geology held in Paris recently.

I. N. R. MORGAN has recently become associated with the Aluminum Company of America at Edgewater, N. J., as Engineer. He was formerly Cadet Engineer, Phelps Dodge Copper Products Corp.

JEROME STRAUSS, formerly Chief Research Engineer, Vanadium Corporation of America, was recently elected Vice-President in charge of Research and Development of that company.

DURANDO MILLER is now with the Colonial Sand and Stone Co., Inc., New York City. He was Vice-President, Blue Diamond Service Corp.

R. S. ARCHER, Chief Metallurgist, Chicago District, Republic Steel Corp., was elected President of the American Society for Metals at the recent annual meeting of that organization and E. C. BAIN, Assistant to Vice-President, United States Steel Corp., was elected Vice-President. ZAY JEFFRIES, Consulting Metallurgist, Aluminum Company of America, received the Albert Sauveur Medal, awarded for outstanding contribution to metallurgical progress.

E. W. MCMULLEN, formerly Vice-President and Plant Manager, The Ault and Wiborg Corp., is now Director of Research, The Eagle-Picher Lead Co., Cincinnati, Ohio.

New Members to December 6, 1935

The following 9 members were elected from October 28 to December 6, 1935:

Company Members (3)

SPERRY GYROSCOPE CO., INC., R. W. Waring, Engineer, Manhattan Bridge Plaza, Brooklyn, N. Y.

STEIN, HALL AND CO., INC., F. G. LaPiana, Textile Technician, 285 Madison Ave., New York City.

TATA HYDRO-ELECTRIC POWER SUPPLY CO., LTD., THE, B. P. Sethna, General Manager, Bombay House, Fort, Bombay, India.

Individual Members (6)

EDWARDS, S. H., Manager, Industrial Steel Treating Co., 600 Fallon St., Oakland, Calif.

FALES, W. D., Head, Department of Textiles, Rhode Island School of Design, Providence, R. I. For mail: 34 Lennon St.

FRANK, W. G., Superintendent of Buildings, City of Utica, City Hall, Utica, N. Y.

POWELL, J. H., Vice-President, Baldt Anchor, Chain and Forge Corp., Sixth and Butler Sts., Chester, Pa.

TCHINNIS, P. M., In Charge of Standards Dept., Samson-United Corp., Rochester, N. Y.

TSACONAS, GEORGE, Massalias Street 1, Athens, Greece.